

Supplementary Materials

Synaptic Characteristics from Homogeneous Resistive Switching in Pt/Al₂O₃/TiN Stack

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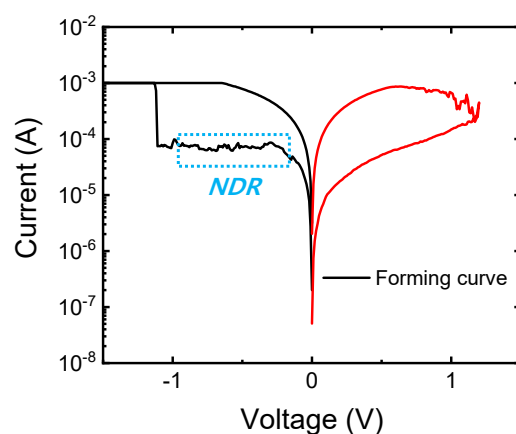


Figure S1. Negative differential resistance behavior in forming curve of Pt/Al₂O₃/TiN device.

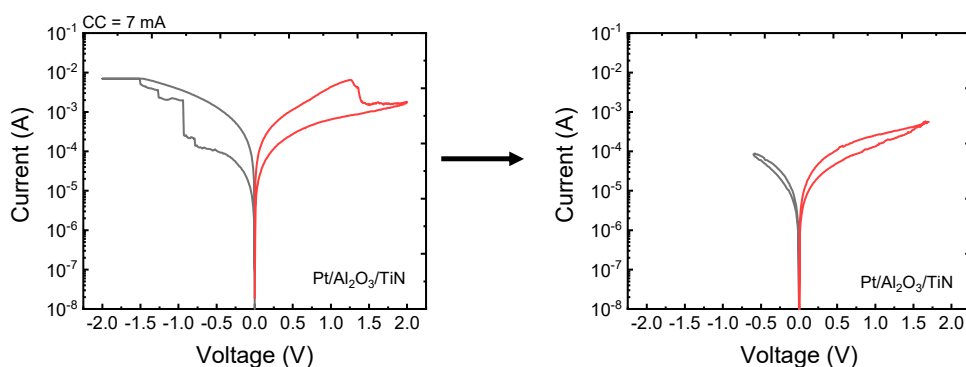


Figure S2. Transition from filamentary switching to homogeneous switching in Pt/Al₂O₃/TiN device.

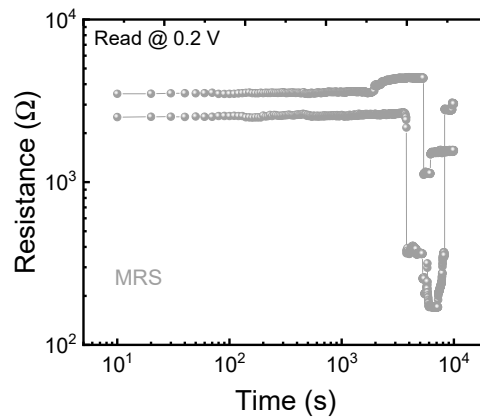


Figure S3. Drift characteristics of filamentary switching with self-compliance (type 2) in middle resistance states of Pt/Al₂O₃/TiN device.

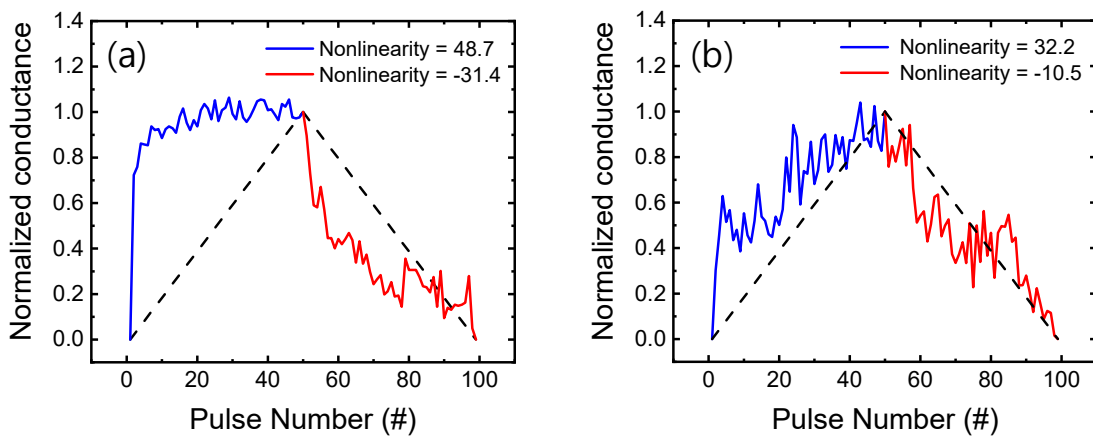
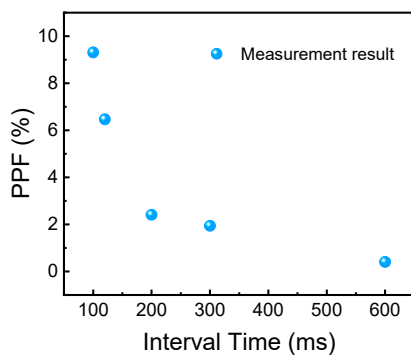


Figure S4. Nonlinearity of the potentiation and depression curves for (a) type 2 and (b) type 3. Nonlinearity is calculated by following equation.

$$NL = \text{average} \left(\left| \frac{G - G_{\text{Linear}}}{G} \right| \times 100 \right)$$



$$PPF (\%) = C_1 \cdot \exp(-t/\tau_1) + C_2 \cdot \exp(-t/\tau_2)$$

$$C_1 = 25.5$$

$$C_2 = 5$$

$$\tau_1 = 70$$

$$\tau_2 = 230$$

Figure S5. PPF index as a function of interval time.